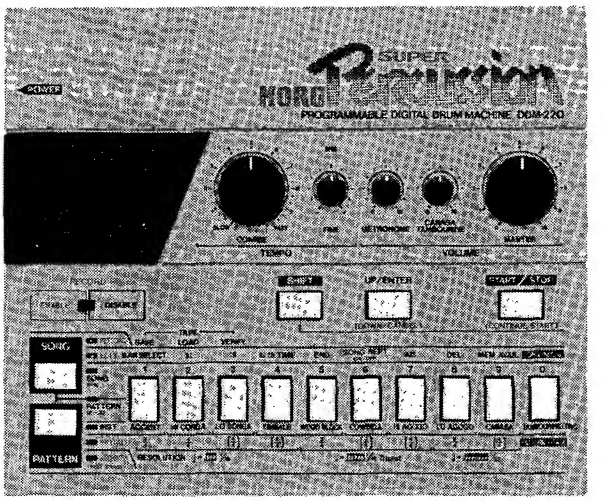
KORG®



PROGRAMMABLE DIGITAL DRUM MACHINE

SERVICE MANUAL DDM-110/220

CONTENTS

KEIO ELECTRONIC LABORATORY CORPORATION
TOKYO/JAPAN

1. SPECIFICATIONS

DDM110

Tone Generators: Bass Drum, Snare Drum, Rimshot, High Tom, Low Tom, Closed High-Hat, Open High-Hat, Cymbal, Handclaps.
Accent: All instruments; ON/OFF; Step
Tempo Control: Coarse (SLOW ~ FAST); FINE (+ ~ –); Tempo indicator
Volume: Master; Metronome; HI HAT, SYMBAL
Pattern Keys: Pattern Mode, Instrument Mode, Initial Mode, Record Mode
Song Keys: Song Mode, Pattern Mode, Edit Mode, Record Mode
Number Keys (Sound Source Keys): Pattern Number Select, Song Number Select, Instrument Select, Initial Select, Pattern Erase, Song Initial Bar Select, Repeat, Repeat Time Select Song Repeat (ON/OFF), Insert, Delete, End, Memory Avail, Tape Interface (Save, Load, Verify)
Record Switch: ENABLE/DISABLE
START/STOP Key: START/STOP
Enter Key: Enter, Step Up/Down, Cancel
Shift Key: Enter Key Function Select; Continue Start; Instrument Erase
Pattern Memory: 32 Patterns (Maximum number of steps: 32 for patterns numbers 1 ~ 16; 16 for pattern numbers 17 ~ 32)
Song Memory: 6 Songs; Maximum Memory Capacity: 385 ~ 390 bars
Display: Pattern Number, Song Number, Bar Number, Step Number, Beat Count, Key Number, Memory Avail, Tape Interface Modes, Battery Check
Sync: 5-Pin DIN Jack IN/OUT Switch
Tape Interface: Tape Switch (DISABLE/FROM/TO), FROM Jack, TO Jack
Inputs: DC 9V; Start/Stop (⏚ GND)
Outputs: Stereo Out (R/MIX, L), Phones, Trigger Out (⏚ GND)
Power Supply: Six 1.5V "Penlight" AA size (SUM-3) batteries or AC adaptor (DC 9V, 300mA); Power Switch
Dimensions: 226(W) x 196(D) x 49(H) mm
Weight: 880g (including batteries)
Supplied Accessories: Shielded Audio Cord (2.5m), Batteries (UM-3 x 6), AC Adaptor

DDM220

Tone Generators: Hi Conga, Lo Conga, Timbale, Wood Black, Cowbell, Hi Agogo, Lo Agogo, Cabasa, Tambourine
Accent: All instruments; ON/OFF; Step
Tempo Control: Coarse (SLOW ~ FAST); FINE (+ ~ –); Tempo indicator
Volume: Master; Metronome; HI HAT, SYMBAL
Pattern Keys: Pattern Mode, Instrument Mode, Initial Mode, Record Mode
Song Keys: Song Mode, Pattern Mode, Edit Mode, Record Mode
Number Keys (Sound Source Keys): Pattern Number Select, Song Number Select, Instrument Select, Initial Select, Pattern Erase, Song Initial Bar Select, Repeat, Repeat Time Select Song Repeat (ON/OFF), Insert, Delete, End, Memory Avail, Tape Interface (Save, Load, Verify)
Record Switch: ENABLE/DISABLE
START/STOP Key: START/STOP
Enter Key: Enter, Step Up/Down, Cancel
Shift Key: Enter Key Function Select; Continue Start; Instrument Erase
Pattern Memory: 32 Patterns (Maximum number of steps: 32 for patterns numbers 1 ~ 16; 16 for pattern numbers 17 ~ 32)
Song Memory: 6 Songs; Maximum Memory Capacity: 385 ~ 390 bars
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Weight: 880g (including batteries)
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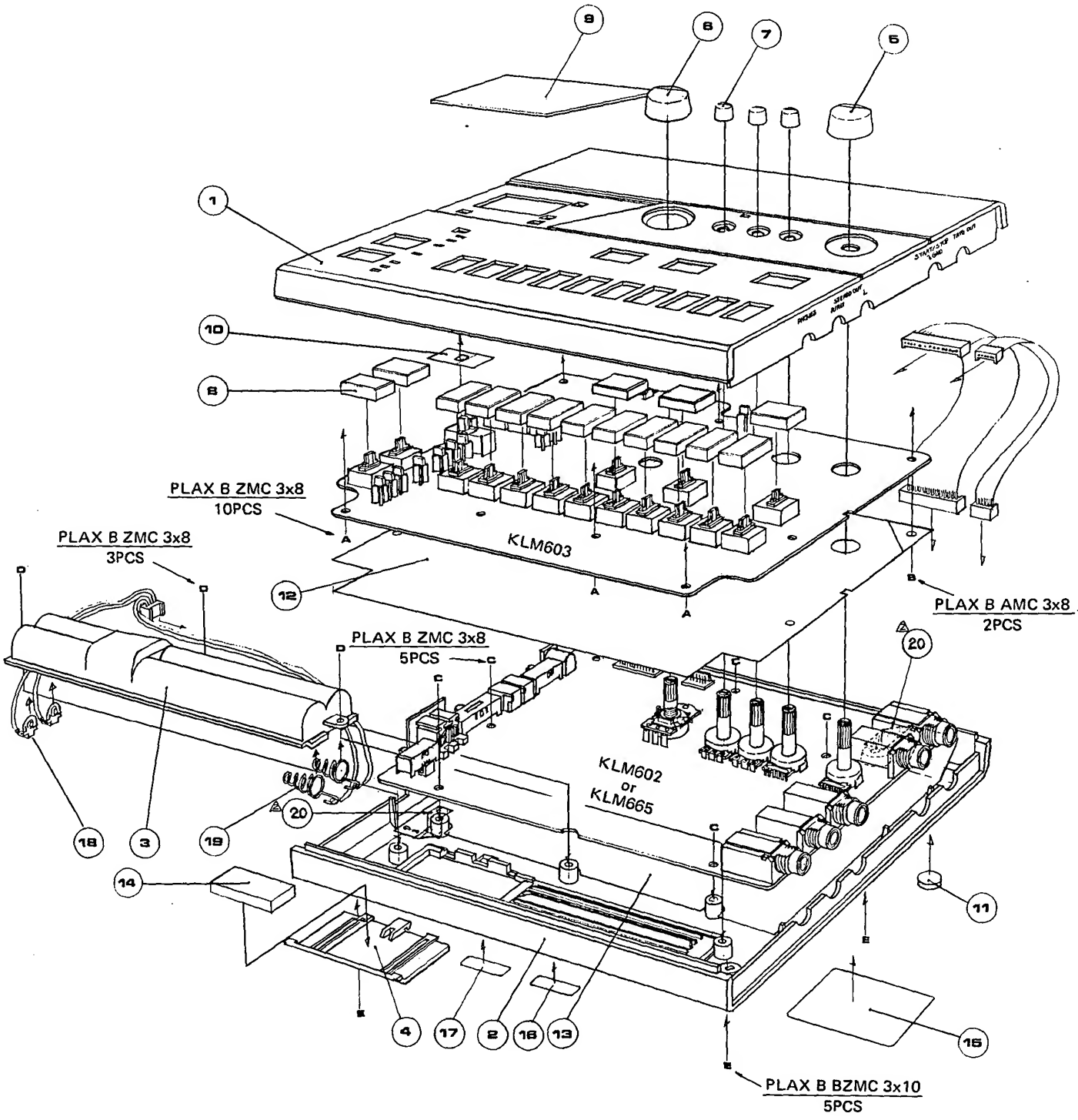
2. STRUCTURAL DIAGRAM

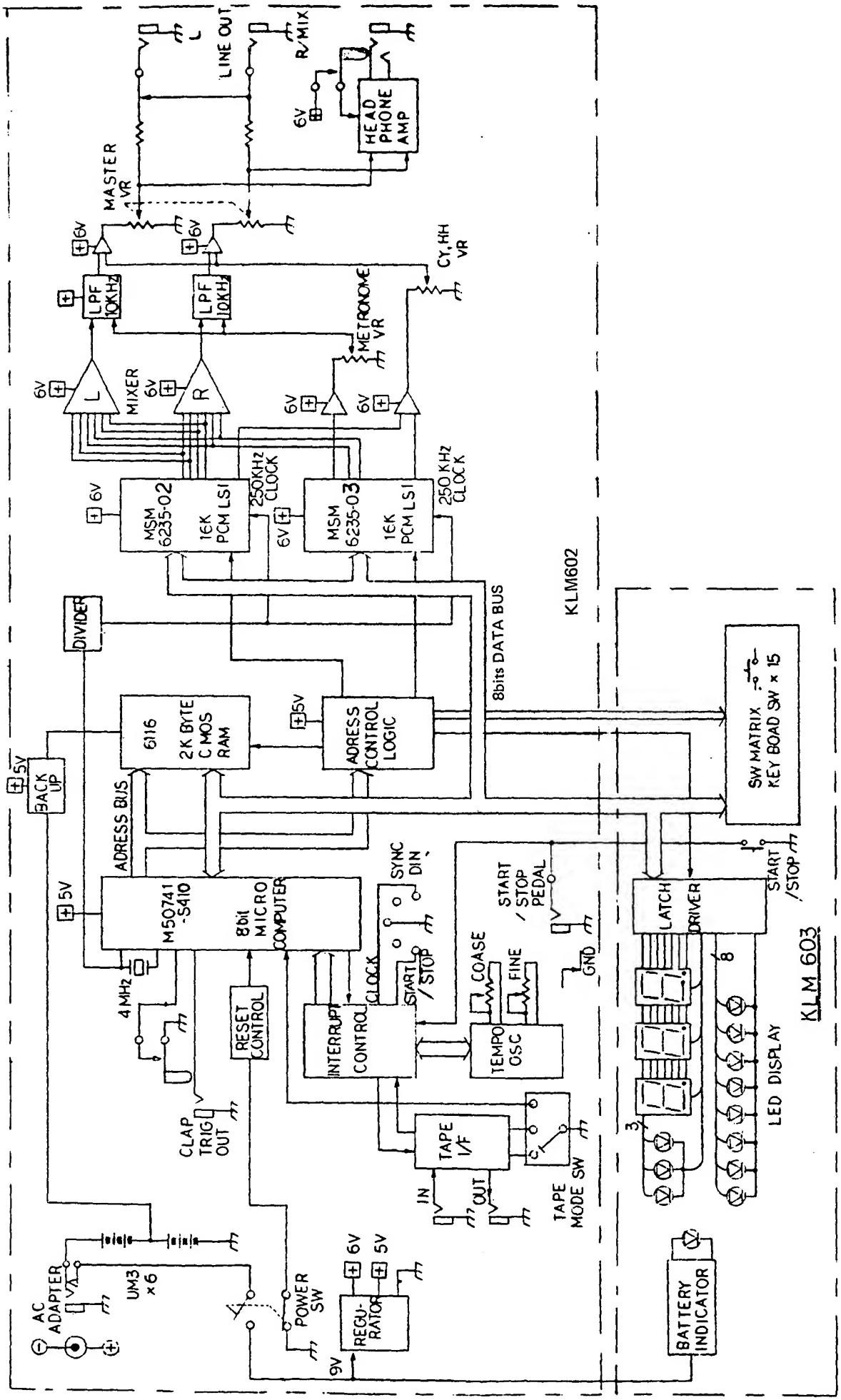


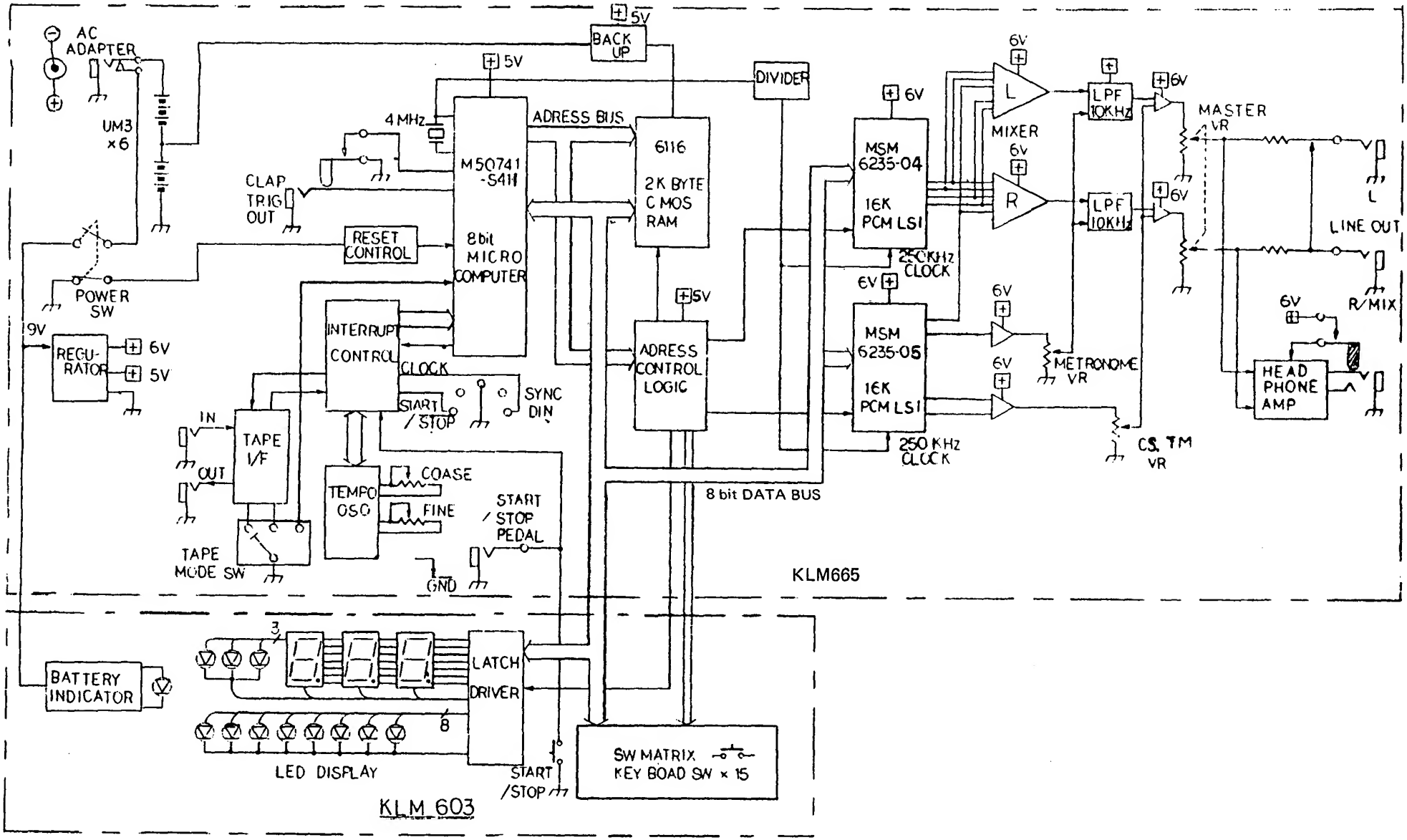
PART No.	PART NAME	PART CODE	REMARK
1.	UPPER CASE	64618400	DDM-110 BLACK
	UPPER CASE	64618500	DDM-220 SILVER
2.	LOWER CASE	64618600	DDM-110/220
3.	BATTERY CASE	64618700	DDM-110/220
4.	BATTERY COVER	64618800	DDM-110/220
5.	VR KNOB (A)	62013300	DDM-110 BLACK
	VR KNOB (A)	62013600	DDM-220 GRAY
6.	VR KNOB (B)	62013301	DDM-110 BLACK
	VR KNOB (B)	62013601	DDM-220 GRAY
7.	VR KNOB (SMALL)	62013400	DDM-110 BLACK
	VR KNOB (SMALL)	62013401	DDM-220 GRAY
8.	PUSH SW KNOB	62013500	DDM-110 BLACK
	PUSH SW KNOB	62013501	DDM-220 IVORY

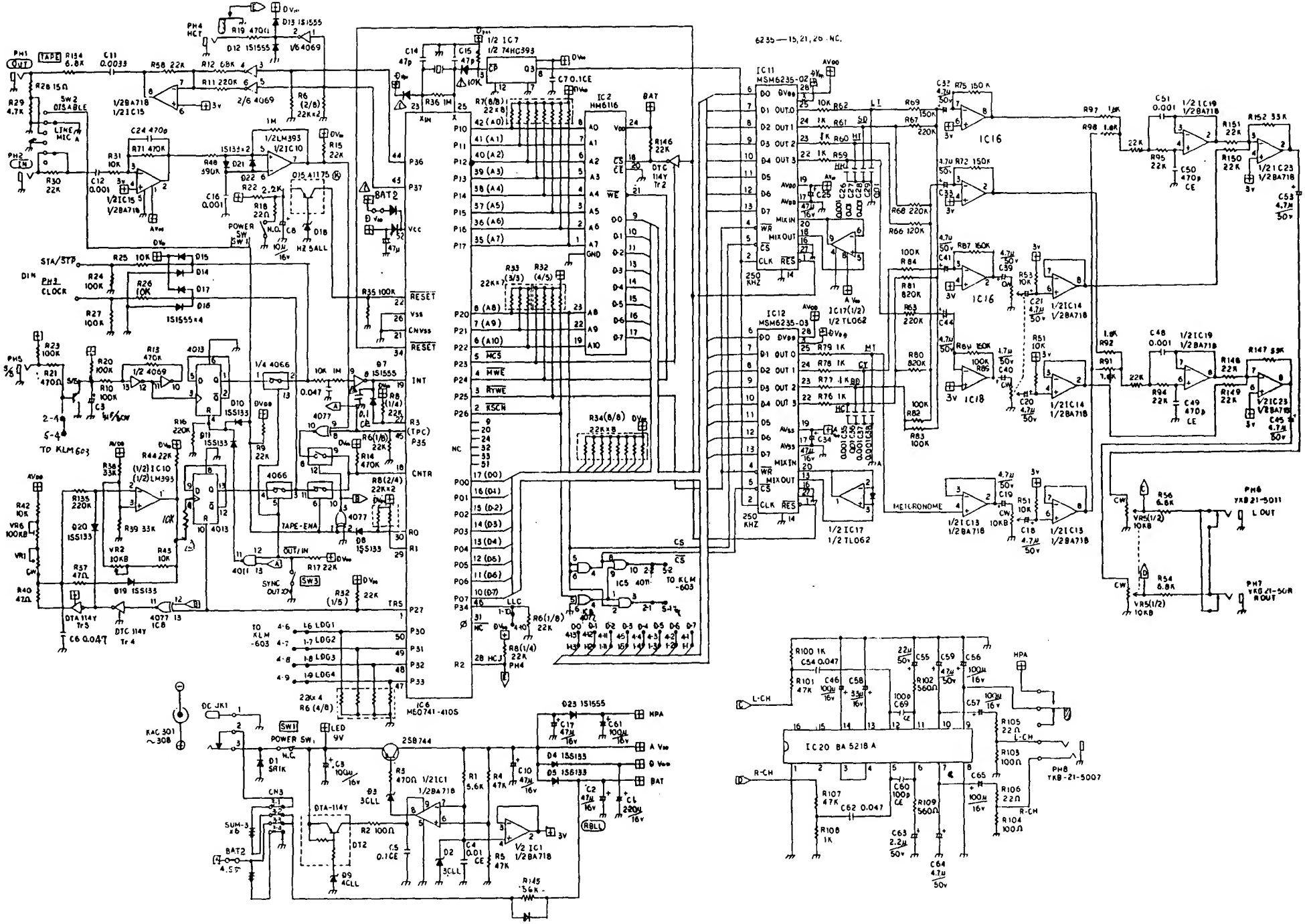
PART No.	PART NAME	PART CODE	REMARK
9.	DISPLAY COVER	63000400	DDM-110/220
10.	RECORD SW MASK	55006500	DDM-110/220
11.	RUBBER FEET	50009100	DDM-110/220
12.	SHIELDING SHEET A	58020700	DDM-110/220
13.	SHIELDING SHEET B	58020701	DDM-110/220
14.	BATTERY CUSHION	50005300	DDM-110/220
15.	CAUTION SEAL	58020101	DDM-110/220
16.	MODEL NUMBER SEAL	58020300	DDM-110
	MODEL NUMBER SEAL	58020400	DDM-220
17.	SERIAL NUMBER SEAL		DDM-110/220
18.	BATTERY TERMINAL (+)	64905300	DDM-110/220
19.	BATTERY TERMINAL (−)	64905400	DDM-110/220

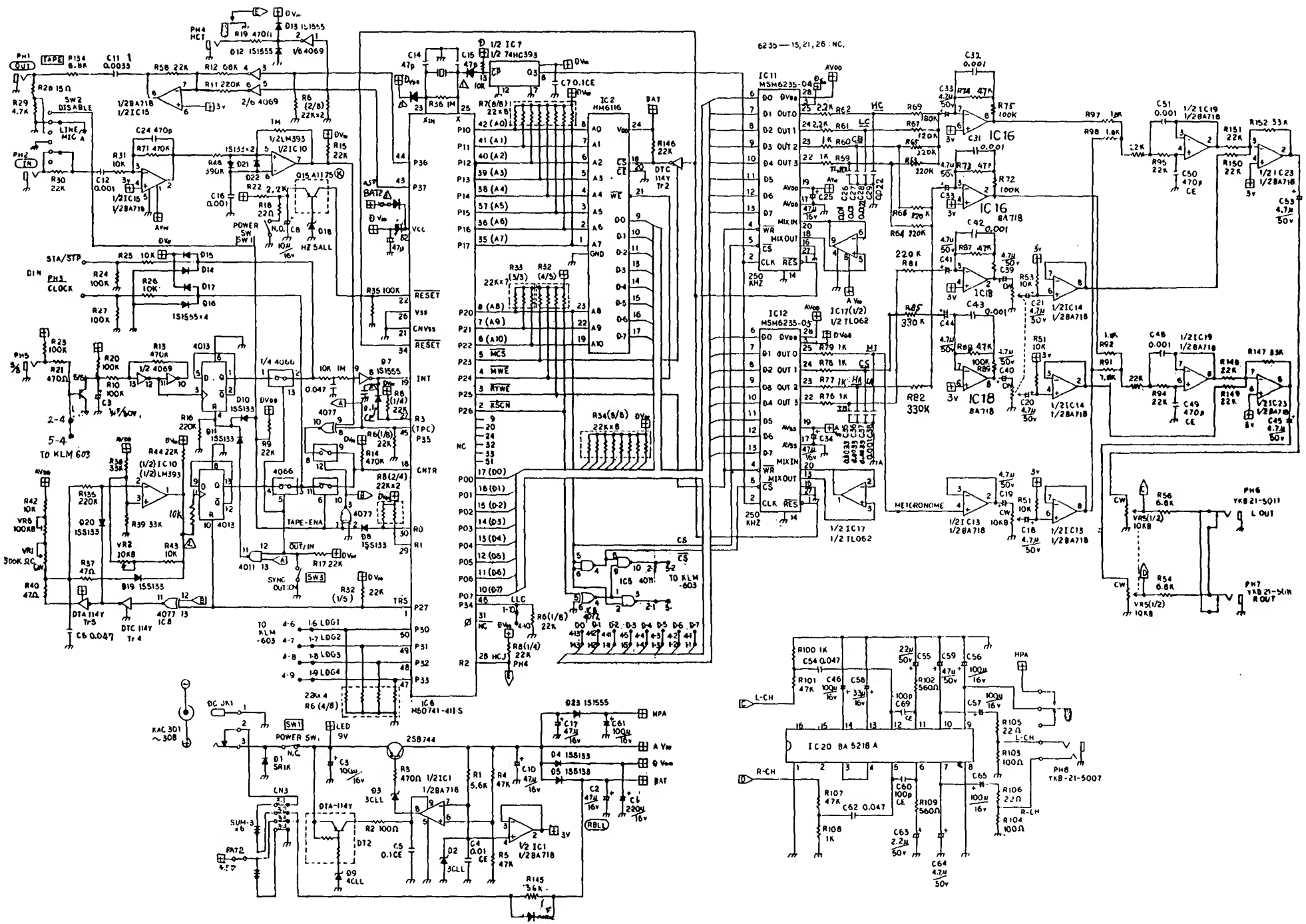
3. BLOCK DIAGRAM

DDM-110

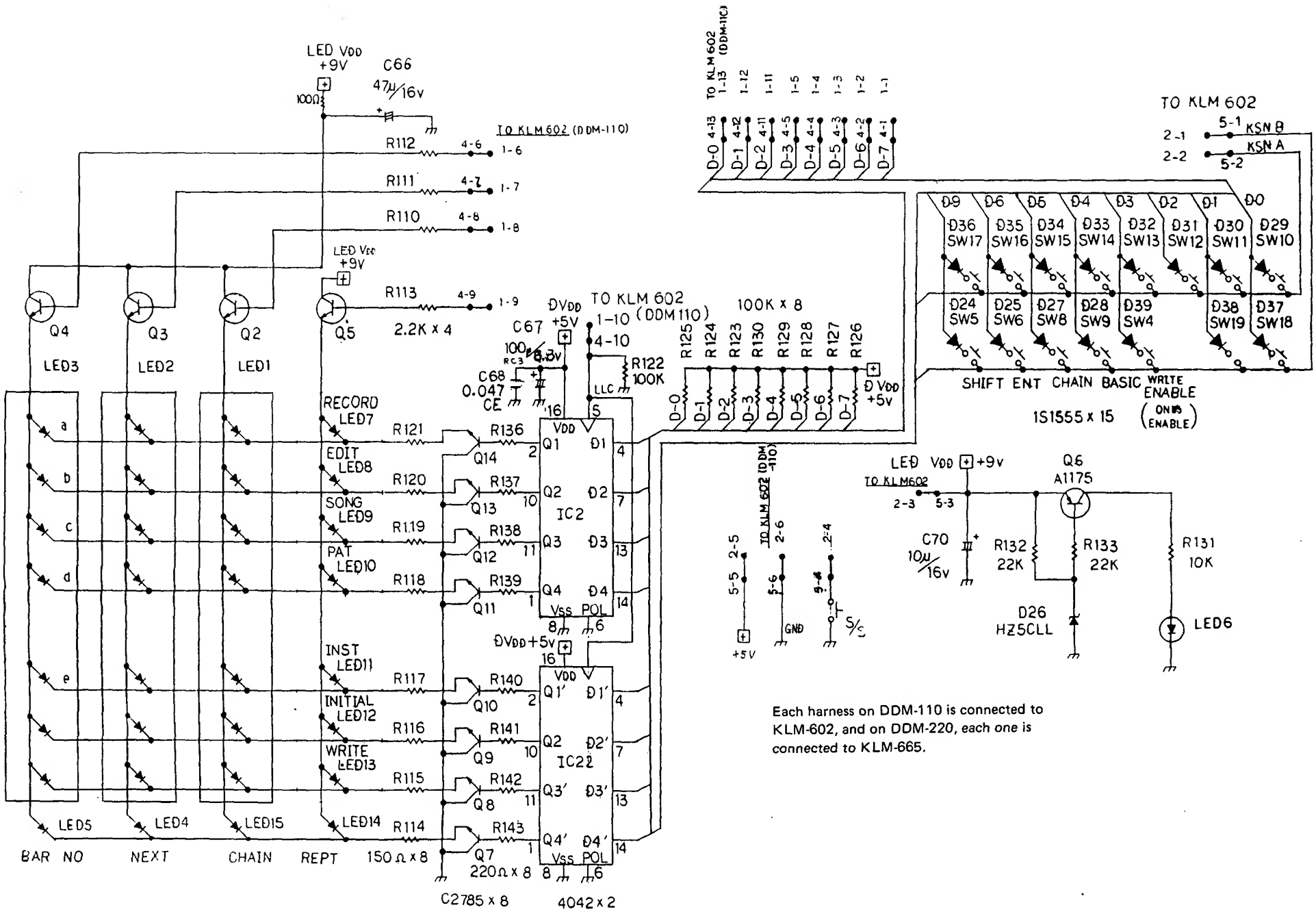



AC ADAPTER
UM3 ×6
POWER SW
9V
REGU-RATOR
6V
5V
5V
BACK UP
5V
DIVIDER
4MHz
ADRESS BUS
M50741 -S411
8bit MICRO COMPUTER
6116
2K BYTE C MOS RAM
CLAP TRIG OUT
RESET CONTROL
INTERRUPT CONTROL
CLOCK
START / STOP
SYNC DIN
IN
OUT
TAPE I/F
TAPE MODE SW
TEMPO OSC
COASE
FINE
START / STOP PEDAL
GND
ADRESS CONTROL LOGIC
5V
6V
MSM 6235-04
16K PCM LSI
MSM 6235-05
16K PCM LSI
6V
6V
250 KHz CLOCK
8 bit DATA BUS
L
R
MIXER
6V
6V
LPF 10KHz
LPF 10KHz
6V
6V
MASTER VR
L
LINE OUT
R/MIX
6V
METRONOME VR
CS, TM VR
HEAD PHONE AMP
KLM665
BATTERY INDICATOR
3
8
LATCH DRIVER
LED DISPLAY
START /STOP
SW MATRIX KEY BOAD SW × 15
KLM 603





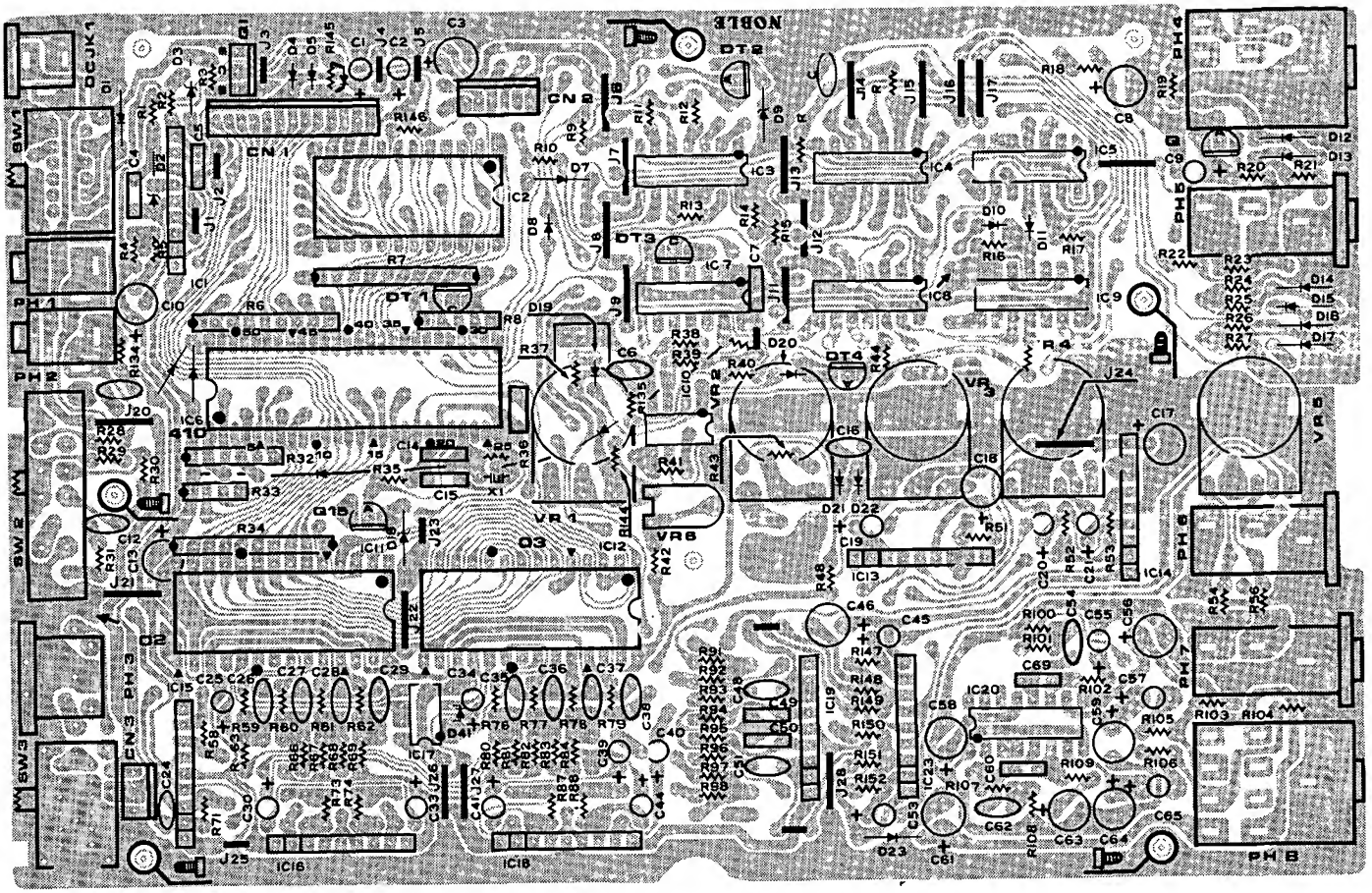
DDM-220, KLM-665



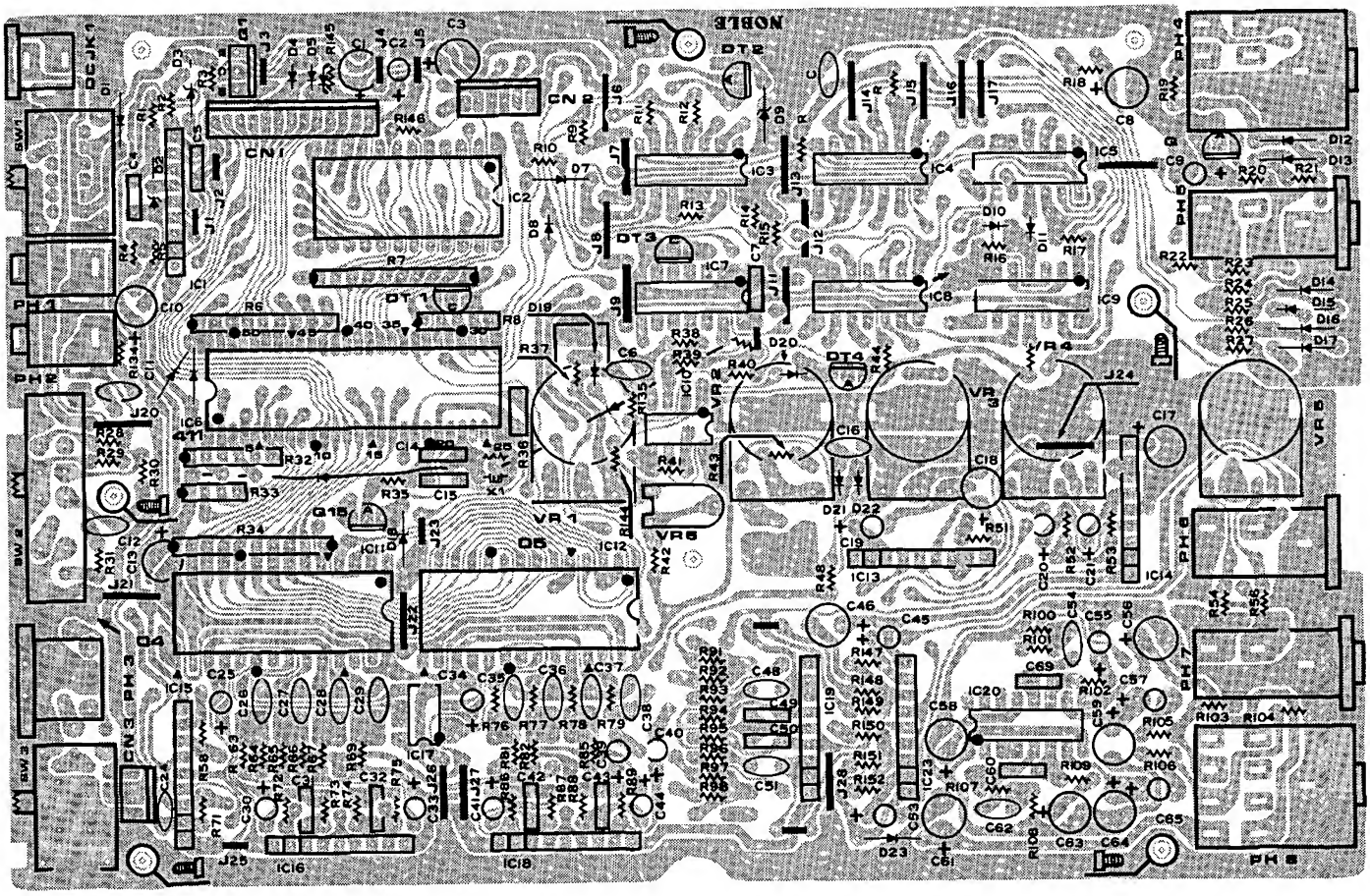
Each harness on DDM-110 is connected to KLM-602, and on DDM-220, each one is connected to KLM-665.

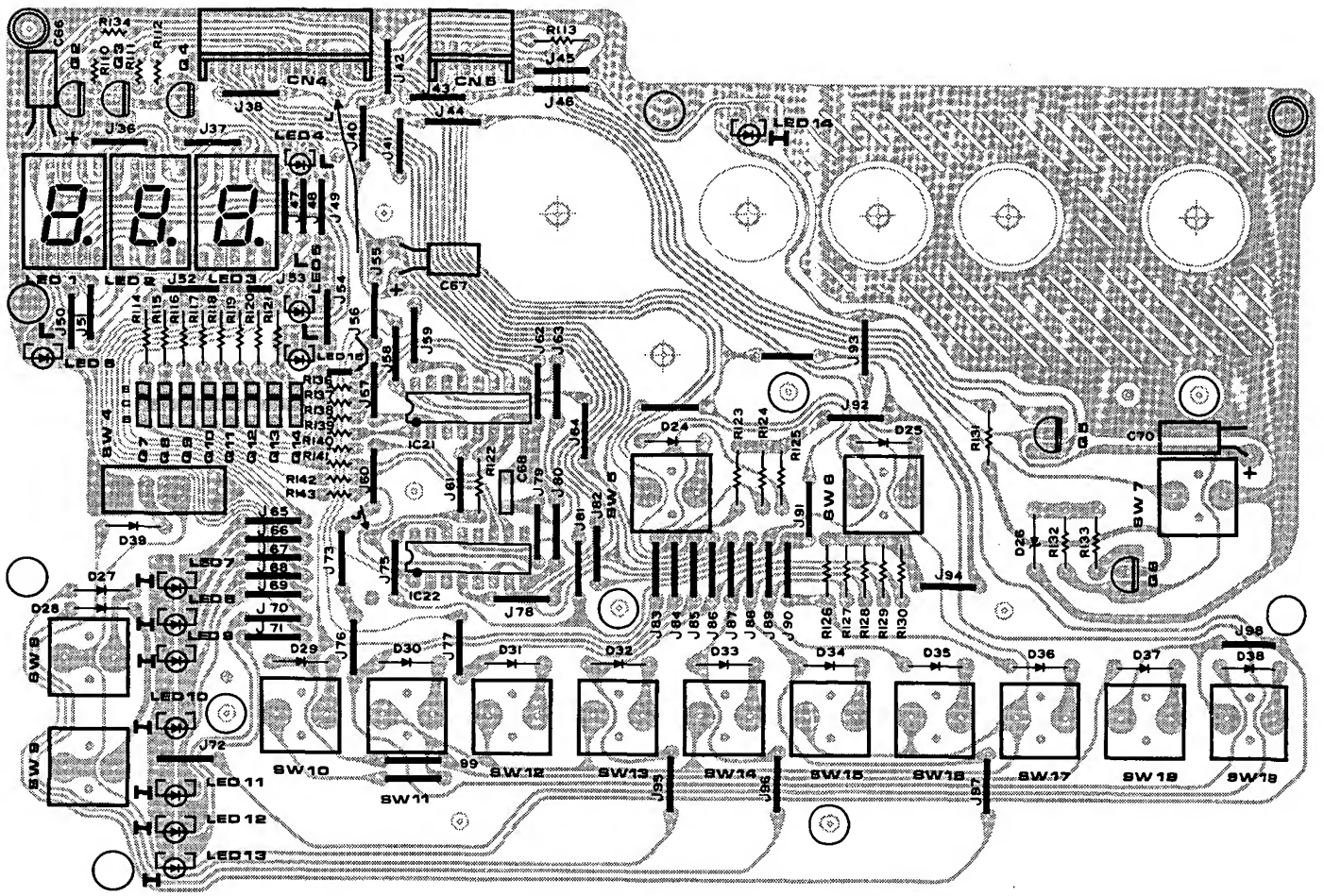
5. PC BOARD

DDM-110, KLM-602



DDM-220, KLM-665





6. ADJUSTMENT PROCEDURE

Tempo Adjustment

1. Turn both the tempo COARSE and FINE knobs all the way clockwise (to the MAXIMUM settings).
2. Connect oscilloscope to IC9 (4013) 13-pin and confirm waveform in figure 1.
3. Adjust VR6 if necessary.

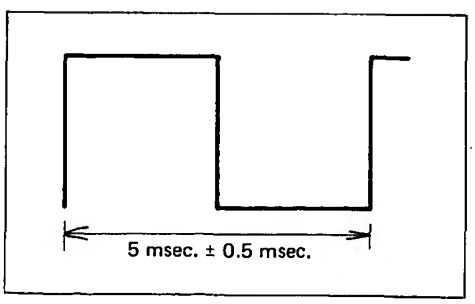


Fig. 1

7. CIRCUIT DESCRIPTIONS

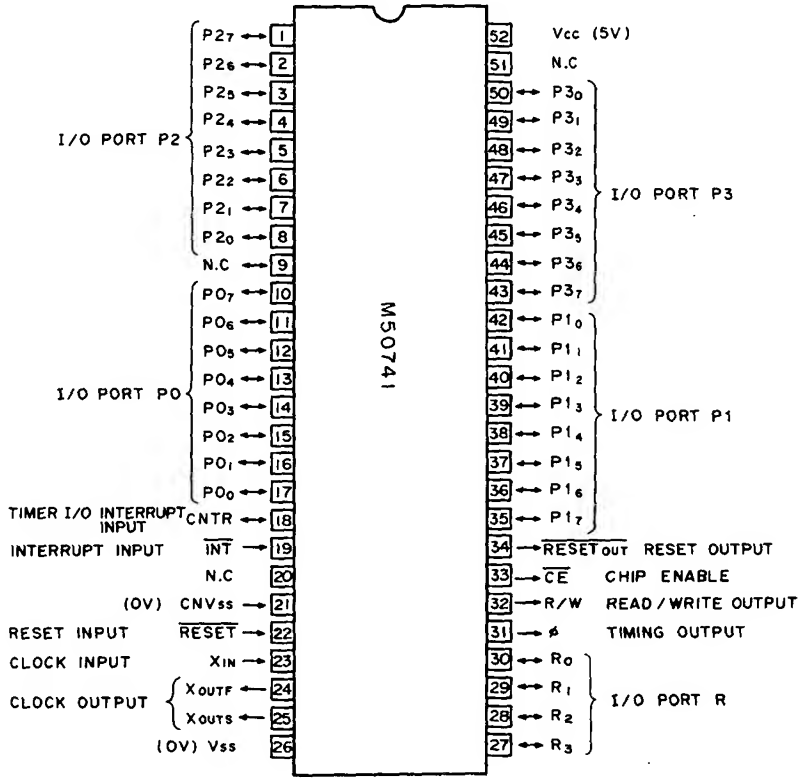
1. DDM-110/220 system structure.

The DDM-110/220 consists of the following sections: CPU, memory, switch input, display, tape interface, tempo oscillator, headphone amp, mixer, LPF, and power supply.

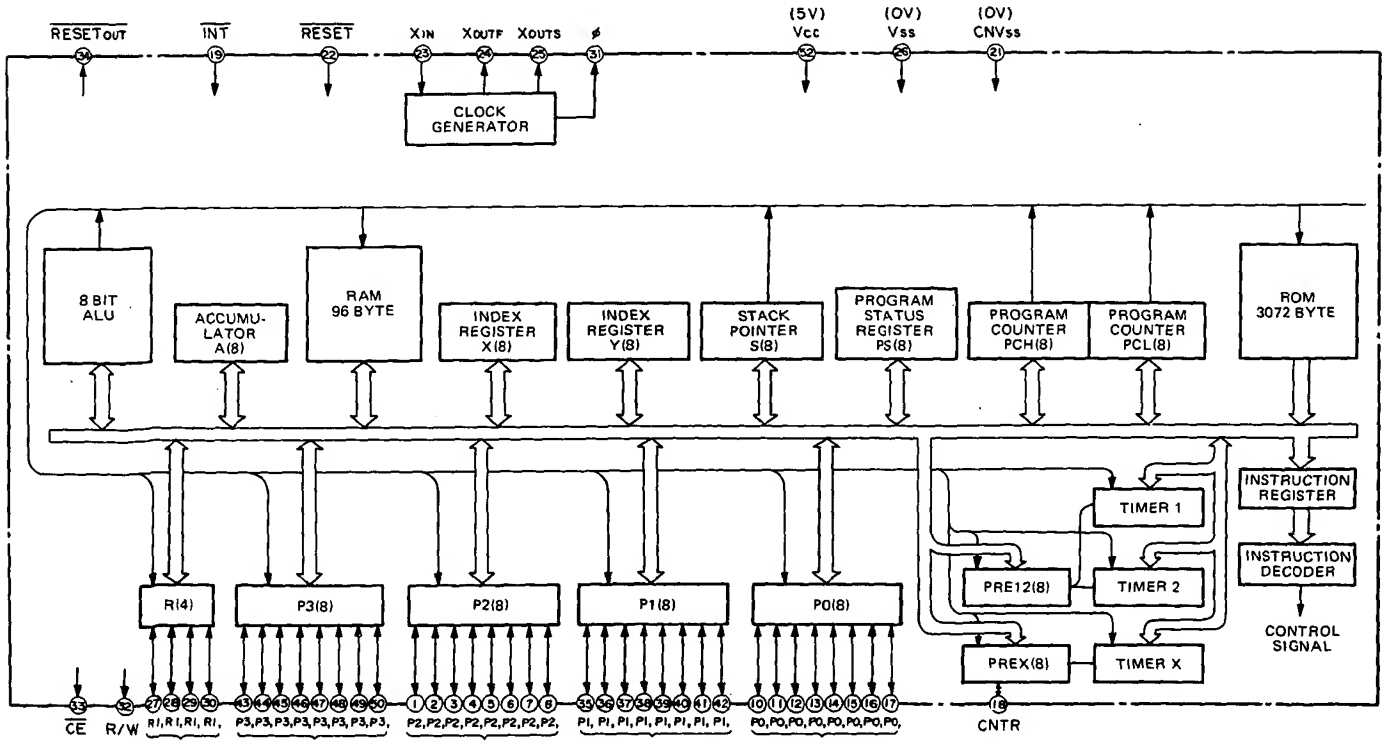
1) The CPU uses an 8-bit microprocessor, the M50741, to control the entire system. The DDM-110 and DDM-220 use different versions of the CPU because of the difference in the programs in ROM. Care must be taken, therefore, when replacing these parts.

Note: The DDM-110 uses the M50741-410S
The DDM-220 uses the M50741-411S

PIN CONFIGURATION



BLOCK DIAGRAM



CPU Terminal Function

Pin	Term	Name	Type	Function
52	VCC	Power supply input	Input	Diode OR circuit constructed with VDD and VBATT
26	VSS	Power supply input	Input	Applies 0V (GND)
21	CNVSS	CNVSS input	Input	Connects to VSS
22	RESET	RESET input	Input	Resets when level goes to low for 2μs or more; power on/off detection.
23	XIN	Clock input	Input	Operates with 4MHz ceramic oscillator connected between XIN and XOUT.
25	XOUT	Clock output	Output	Output for internal clock generator. This output is converted to 250kHz by IC7 (74HC393) and used for MSM6235 clock.
18	CNTR	Timer input	Input	Input for clock signal from external device or internal tempo oscillator circuit. Produces basic timing for DDM tempo; also used during tape interface input.
19	INT	Interrupt input	Input	For start/stop control. Start – low; Stop – high.
10–17	P00–P07	I/O port P0	Input & output	An 8-bit I/O port used as data bus.
35–42	P10–P17	Output port P1	Output	Address bus output port. A(0)–A(10).
6–8	P20–P22	Output port P2	Output	As above.
2–5	P23–P26	I/O port P2	Input & output	MCS, MWE, RYWE, KSCN
1	P27	Output port P2	Output	Outputs high pulse when start switch turns on. Controls tempo oscillator circuit.
43–50	P30–P37	Output port P3	Output	P30–P33 4 bits control LED display. P34 1 bit is for LED clock. P35 1 bit controls tape interface input phase. P36–P37 are for tape interface output and P37 is for handclaps trigger out.
27–30	R0–R3	Input port R	Input	R0 1 bit is for tape interface position detection. R1 is high level. R2 detects whether anything is plugged into the TRIG OUT jack. Note: Observation of the R port waveform will show an output signal in time with the address signal. However, in this unit a diode is employed and these are only used as inputs.
34	RESET OUT	Reset output	Output	Reset signal output for MSM6235.

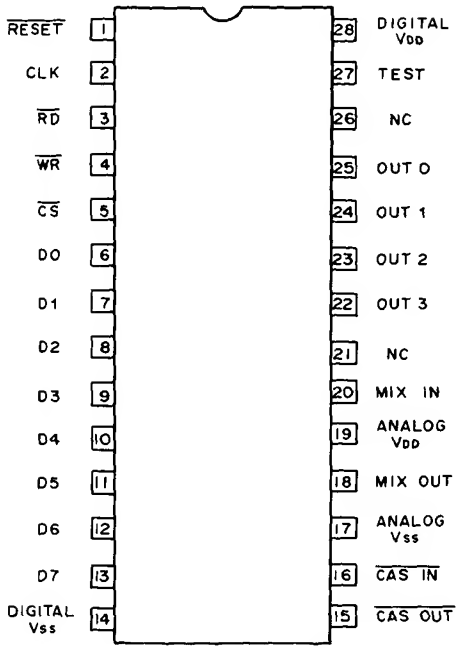
2) Memory Section

This RAM (16k bit CMOS Random Access Memory HM 6116) is used, via the CPU, for reading and writing rhythm patterns and performance sequences, etc.
This data is backed up by a battery. Data will be lost if the battery has not been put in or if it runs low. In such cases, load data from the data tape, using the tape interface.
In addition, the power supply circuit C2 capacitor (47μF/16V RBLL) is used for short-term memory backup. If replacement is necessary, be sure to use the same type, having low leakage current.
The 6235RS is an LSI with PCM encoded recordings of instrument sounds and a D/A converter with 8-bit data bus interface, all on a single chip. Under CPU control, this can produce up to four sounds simultaneously. The DDM units each use two of these LSI chips so they can generate up to eight sounds at once.

Note 1: On the DDM-110, the hi-hat (HH) open and closed sounds cannot be sounded at the same time, they both use the same terminal; the same is true for the snare and rimshot sounds.
On the DDM-220, the timble and woodblock cannot be sounded together; the same is true for the hi-agogo and lo-agogo.

Note 2: The MSM6235 chip version number is different for the DDM-110 and DDM-220. Be careful not to confuse the two when replacing this part.

PIN CONFIGURATION



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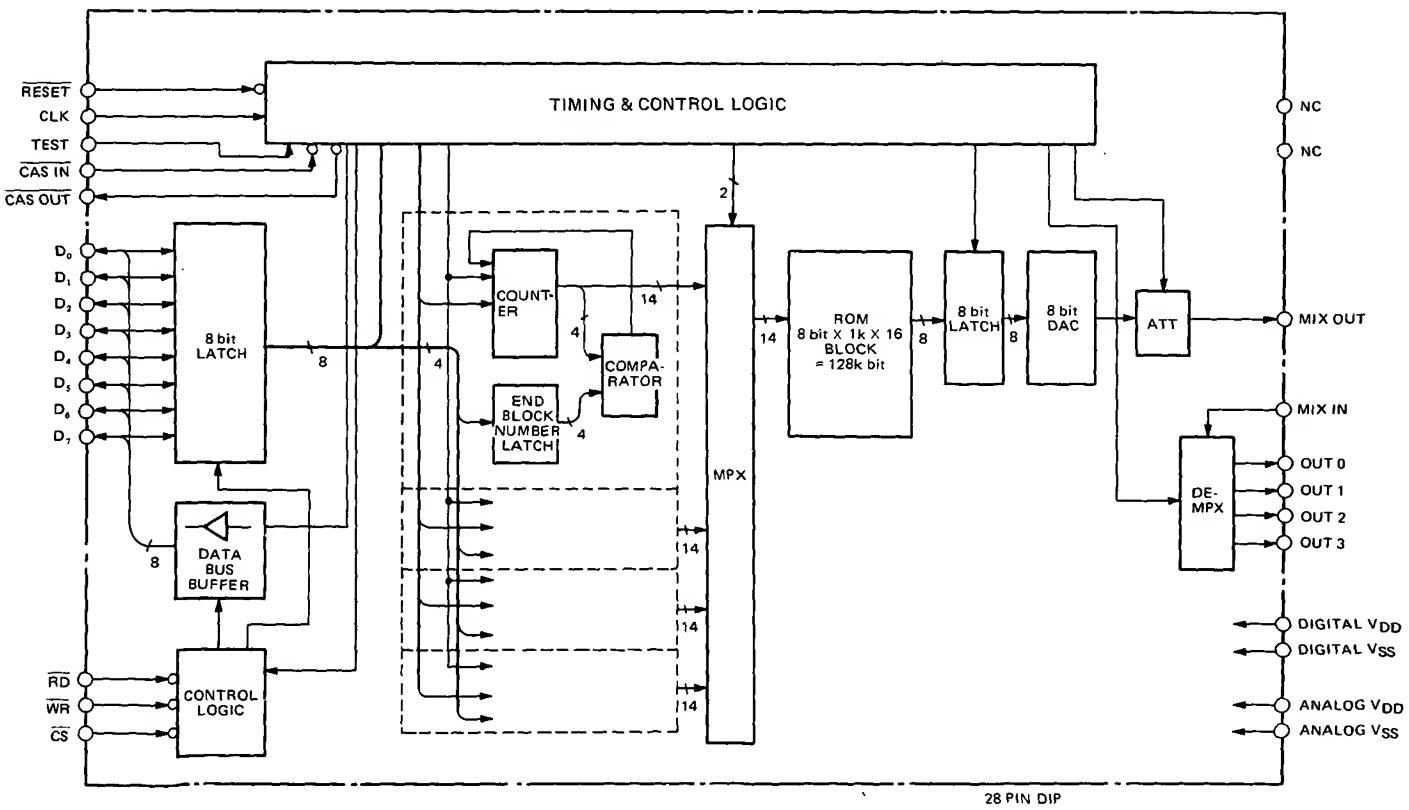


MSM6235 Terminal Functions

Pin	Term	Function
1	RESET	Input terminal for internal initialization. Low level is active.
2	CLK	Input for timing signal.
3	RD	As long as this input is low, the D0–D7 terminals become outputs, for reading internal status information to the CPU. However, this is only enabled when the CS (chip select) terminal is at low level.
4	WR	As long as this input is low, this LSI inputs control words from the CPU via the data bus and latches the trailing edge. However, the CS terminal must be low level for this to be enabled.
5	CS	The chip select terminal for this LSI. Low level enables the WR and RD terminals. High level disables them.
6–13	D0–D7	An 8-bit 2-way data bus terminal connected to the CPU system data bus. This is used as an output when CS and RD are low. Otherwise it is an input.
18	MIX OUT (mixed signal output)	Serial output of 4-channel analog signal. This signal is impedance converted and input to the MIX IN terminal.
20	MIX IN (mixed signal input)	This input takes the MIX OUT 4-channel serial analog output for separate output through the OUT 0–3 terminals. The MIX OUT signal is converted to low impedance before input to this terminal.
22–25	OUT 0–3	Time shared output for each channel from MIX IN input. Uses analog switching.
14, 28	Digital VDD, VSS	Power supply input for digital sections of this LSI.

3) Switch input section and display section.

The DDM-110 and DDM-220 both use the KLM-603 board. The CPU reads key input data, processes it, and lights the appropriate LEDs.

Note: This board is the same for the DDM-110 and DDM-220 but the harness destination is the KLM-602 for the DDM-110, and the KLM-665 for the DDM-220.

4) Tape interface section.

Used to save digital data from RAM to cassette tape and to load it back from tape to RAM. For output to tape, the data is sent using CPU ports P36 and P37. For input to RAM, the CPU CNTR terminal is used.

5) Tempo oscillator circuit.

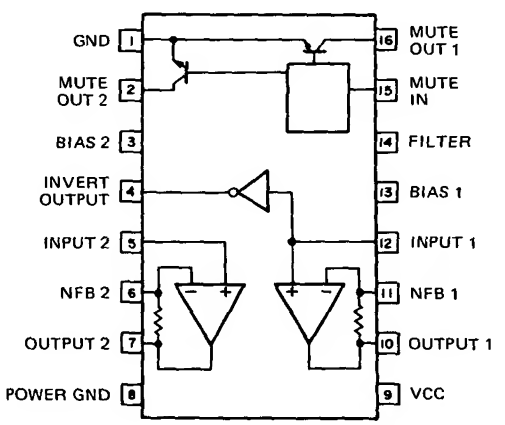
This oscillator uses the LM393 (IC10) comparator IC. The tempo control FINE knob varies hysteresis and the COARSE knob adjusts the time constant.

6) Headphone amp.

To avoid unnecessary battery drain, this is designed to operate only when headphones are plugged into the jack. So when performing service procedures remember to plug headphones into this jack, otherwise the circuit will not operate.

BA5218A

BLOCK DIAGRAM



7) Power supply section.

To prevent battery leakage, this circuit is designed to cut off when voltage drops below about 4.6V. C2 is a capacitor used to maintain voltage for memory backup.

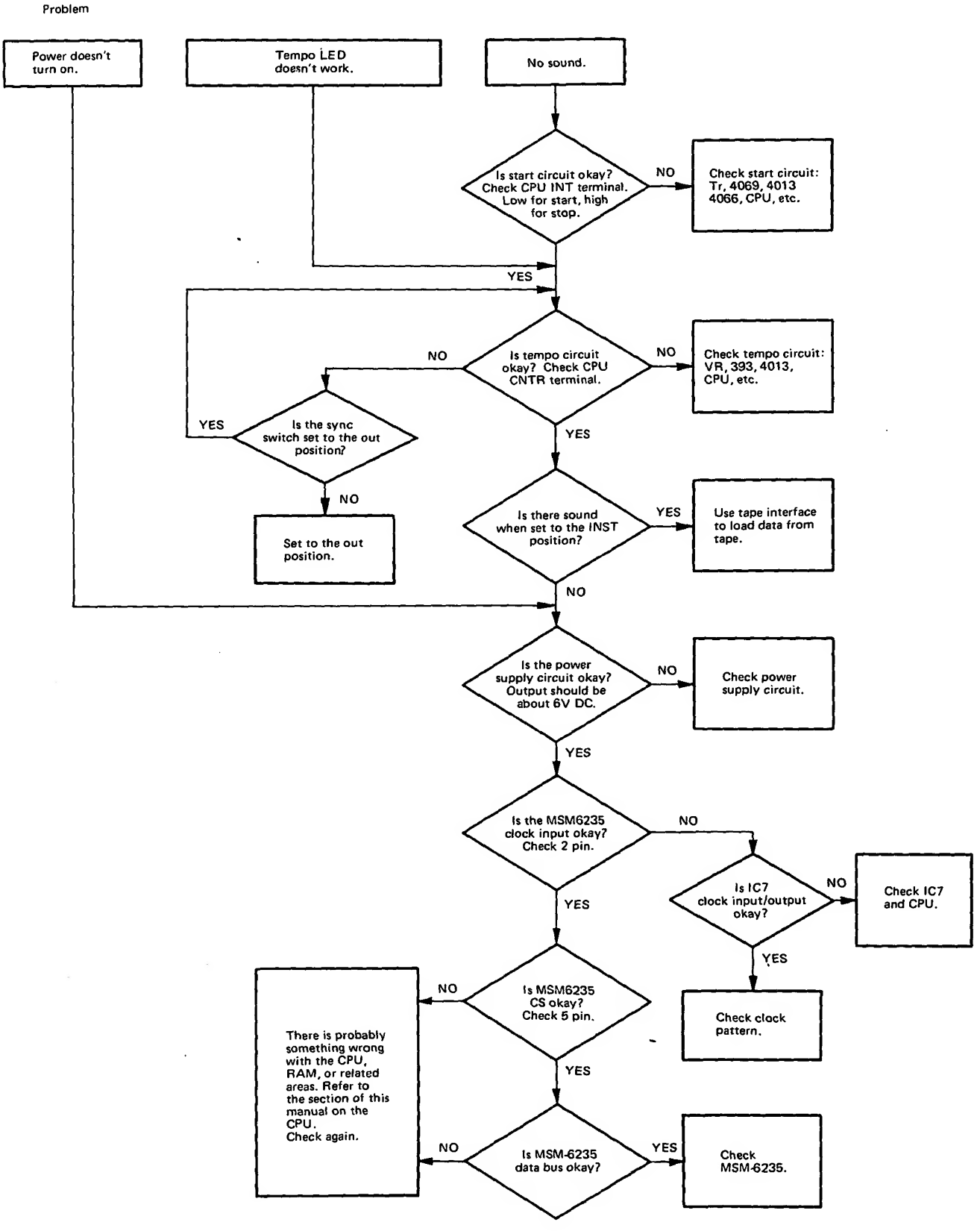
8) Mixer and LPF sections.

Please note that the mixer time constants are different for the DDM-110 and DDM-220.

8. TROUBLESHOOTING CHART

Troubleshooting Chart

The order in which things should be checked naturally coincides with the signal path in the DDM-110/220. Please refer to this chart to help pinpoint sources of trouble. Remember to save user data to tape before beginning service procedures.



9. PARTS LIST

PART CODE	PART NAME SPECIFICATIONS	P.C. BOARD 110	P.C. BOARD 220	Q'TY 110	Q'TY 220	IDENTIFICATION NO. FUNCTION
	CARBON RESISTORS					
10016510	1/6JY 10K	602	665	1	1	
10413315	S1/4JYTP 150Ω	603	603	8	8	
10413422	S1/4JYTP 2.2K	603	603	1	1	
10413510	S1/4JYTP 10K	603	603	1	1	
10413522	S1/4JYTP 22K	603	603	2	2	
10413610	S1/4JYTP 100K	603	603	9	8	
10416000	1/6JTP 0Ω	602	665	10	10	
		603	603	2	2	
10416215	1/6JTP 15Ω	602	665	1	1	
10416222	1/6JTP 22Ω	602	665	3	3	
10416247	1/6JTP 47Ω	602	665	2	2	
10416310	1/6JTP 100Ω	602	665	3	3	
		603	603	1	1	
10416322	1/6JTP 220Ω	602	665	1	1	
		603	603	8	8	
10416347	1/6JTP 470Ω	602	665	3	3	
10416356	1/6JTP 560Ω	602	665	2	2	
10416410	1/6JTP 1.0K	602	665	10	8	
10416418	1/6JTP 1.8K	602	665	4	4	
10416422	1/6JTP 2.2K	603	603	3	3	
			665		3	
10416447	1/6JTP 4.7K	602	665	1	1	
10416456	1/6JTP 5.6K	602	665	1	1	
10416468	1/6JTP 6.8K	602	665	3	3	
10416510	1/6JTP 10K	602	665	9	9	
10416522	1/6JTP 22K	602	665	15	15	
10416533	1/6JTP 33K	602	665	4	4	
10416547	1/6JTP 47K	602	665	4	8	
10416556	1/6JTP 56K	602	665	1	1	
10416568	1/6JTP 68K	602	665	1	1	
10416610	1/6JTP 100K	602	665	9	10	
		603	603	1	1	
10416612	1/6JTP 120K	602	665	1	1	
10416615	1/6JTP 150K	602	665	5	0	
10416618	1/6JTP 180K	602	665	0	1	
10416622	1/6JTP 220K	602	665	6	8	
10416633	1/6JTP 330K	602	665	0	2	
10416639	1/6JTP 390K	602	665	1	1	
10416647	1/6JTP 470K	602	665	3	3	
10416682	1/6JTP 820K	602	665	2	0	
10416710	1/6JTP 1.0M	602	665	3	3	
	BLOCK RESISTOR					
13503522	RKC1/8B3J 22K	602	665	1	1	
13504522	RKC1/8B4J 22K	602	665	1	1	
13505522	RKC1/8B5J 22K	602	665	1	1	
13508522	RKC1/8B8J 22K	602	665	1	1	
13608522	RKC1/8B8DJ 22K	602	665	2	2	
	MYLAR CAPACITORS					
20402410	50V 0.001μF K	602	665	9	9	
20402433	50V 0.0033μF K	602	665	1	4	
20402510	50V 0.01μF K	602	665	3	2	
20402522	50V 0.022μF K	602	665	0	2	
20402547	50V 0.047μF K	602	665	4	4	
	CERAMIC CAPACITORS					
21452470	50V 47PF TP	602	665	2	2	
21453100	50V 100PF TP	602	665	2	2	
21453470	50V 470PF TP	602	665	3	3	
21455100	50V 0.01μF TP	602	665	1	1	
21455470	50V 0.047μF TP	603	603	1	1	
21456100	25V 0.1μF TP	602	665	3	3	
		603	603	2	2	
	ELECTROLYTIC CAPACITORS					
25402322	10V 220μF RE.T2	602	665	1	1	
25403210	16V 10μF RE.T2	602	665	1	1	
		603	603	1	1	
25403233	16V 33μF RE.T2	602	665	1	1	
25403247	16V 47μF RE.T2	602	665	5	5	
		603	603	1	1	
25404147	25V 4.7μF RE.T2	602	665	6	6	
25406110	50V 1μF RE.T2	602	665	1	1	
25406122	50V 2.2μF RE.T2	602	665	2	2	
25411310	6.3V 100μF RC-T2	602	665	5	5	

PART CODE	PART NAME SPECIFICATIONS	P.C. BOARD 110	P.C. BOARD 220	Q'TY 110	Q'TY 220	IDENTIFICATION NO. FUNCTION
25413310	16V 100μF RC-T2	602	665	1	1	
25423247	16V 47μF RB-LL.T2	602	665	1	1	
25451310	6.3V 100μF RC-3-T2	603	603	1	1	
25454147	25V 4.7μF RC3-T2	602	665	8	8	
	TRANSISTORS					
30100328	TR 2SB744 A P/Q	602	665	1	1	
30400020	TR 2SA1175 K TN	602	665	2	2	
		603	603	1	1	
30420020	TR 2SC2785 K TN	603	603	12	12	
	DIGITAL TRANSISTORS					
30430030	TR DTA-114Y T-93	602	665	2	2	
30430040	TR DTC-114Y T-93	602	665	2	2	
	DIODES					
31000800	1S2473	602	665	4	4	
31001500	SR1K-2	602	665	1	1	
31400300	1S-2473 T-77	602	665	12	8	
		603	603	15	15	
31401300	1SS-133 T-77	602	665	10	9	
	LED					
31203600	SLP-178C	603	603	7	7	
31203700	SLP-278C	603	603	5	5	
31203800	LA401-VF K/L	603	603	3	3	
	ZENER DIODES					
31422500	HZ-5CLL-TD	603	603	1	1	
31423100	HZ-4CLL-TD	602	665	1	1	
31423300	HZ-5ALL-TD	602	665	1	1	
31423400	HZ-3CLL-TD	602	665	2	2	

PART CODE	PART NAME SPECIFICATIONS	P.C. BOARD 110	P.C. BOARD 220	Q'TY 110	Q'TY 220	IDENTIFICATION NO. FUNCTION
	IC					
32003063	TC-40H393 P	602	665	1	1	DUAL 4 BIT BINARY COUNTER
32004004	HD-14066 BP	602	665	1	1	QUAD ANALOG Switch
32004008	HD-14011 BP	602	665	1	1	QUAD 2-INPUT NAND GATE
32004009	HD-14013 BP	602	665	1	1	DUAL TYPE D FILP FLOP
32004013	HD-14042 BP	603	603	2	2	QUAD LATCH
32004019	HD-14069 UBP	602	665	1	1	HEX INVERTER
32004028	HM-6116LP-4	602	665	1	1	2048 WORD x 8 BIT STATIC RAM
32004070	HD-14077BP	602	665	1	1	QUAD EXCLUSIVE NOR GATE
32006013	MSM-6235RS-02	602	665	1	0	
32006014	MSM-6235RS-03	602	665	1	0	
32006015	MSM-6235RS-04	602	665	0	1	
32006016	MSM-6235RS-05	602	665	0	1	
32007004	BA-718	602	665	8	8	OP AMP
32007009	BA6993	602	665	1	1	
32007011	BA5218A	602	665	1	1	HEAD PHONE AMP
32011037	M50741-410SP	602	665	1	0	CPU
32011038	M50741-411SP	602	665	0	1	
32021022	TL-062	602	665	1	1	
	CERAMIC OSCILLATOR					
33501400	KBR-4.0MHZ	602	665	1	1	
	SEMI-FIXED RESISTOR					
35121410	VR B100K	602	665	1	1	
	ROTARY VR					
36017000	K162H0012-10KB x 2	602	665	2	2	MASTER, HH/CYMBAL
36017100	K161B002Y-10KB	602	665	2	2	TEMPO FINE, METRONOME
36018100	K16110COJE-500KC	602	665	1	1	TEMP COARSE

PART CODE	PART NAME SPECIFICATIONS	P.C. BOARD 110	P.C. BOARD 220	Q'TY 110	Q'TY 220	IDENTIFICATION NO. FUNCTION
SLIDE SW						
37303900	SW R-S47836	602	665	2	2	POWER SW, SYNC SW
37304800	SW SSB-323055	602	665	1	1	TAPE INTERFACE SW
37305000	SW SSY-022	603	603	1	1	RECORD SW
PUSH SW						
37506900	SW KMR-VO1AV	603	603	15	15	
AC ADAPTERS						
40502700	KAC-302					UNI
						117 2P
40502800	KAC-303					JAM
40503000	KAC-305					240 AU
40503100	KAC-306					240 RM
40503200	KAC-307					240 AF
40503300	KAC-308					220 GE
						220 SE
						DEMKO
						SEMKO
						NEMKO
						GAF
						FIMKO
DC INPUT JACK						
45400300	HEC-0470-01-230	602	665	1	1	
MINI-PHONE JACK						
45400900	HSJ-0786-01-010 3.5ϕ	602	665	2	2	
DIN JACK						
45402500	TCS4650-01-1111	602	665	1	1	
PHONE JACK						
45404100	YKB21-5008	602	665	1	1	
45404200	YKB21-5004	602	665	1	1	
45404300	YKB21-5012	602	665	3	3	

PART CODE	PART NAME SPECIFICATIONS	P.C. BOARD 110	P.C. BOARD 220	Q'TY 110	Q'TY 220	IDENTIFICATION NO. FUNCTION
HARNESS						
47043000	HNS-330	602	665	1	1	
47043100	HNS-331	602	665	1	1	
47043200	HNS-332	602	665	1	1	
MP CONNECTOR						
47408804	S4P W-P2604 #51	602	665	1	1	
47408806	S6P W-P2606 #51	602	665	1	1	
47408813	S13P W-P2613 #51	602	665	1	1	
47408906	L6P W-P2806 #51	603	603	1	1	
47408913	L13P W-P2813 #51	603	603	1	1	
BATTERY CUSHION						
50005300	KOC-F40218			1	1	
RUBBER FEET						
50009100	KOC-F40296			2	2	
BATTERY						
52000300	SUM-3DG 1.5V			6	6	
GND TERMINAL						
54010400	TER51-0032-2ALH-S			1	1	
RECORD SW MASK						
55006500	X-364.5 KOC-F40295			1	1	
LED SPACER						
57503700	NO.1 7.2MM E40171	603	603	8	8	
57503800	NO.2 4.8MM E40171	603	603	4	4	
CAUTION SEAL						
58020101	KOC-F40301			1	1	

PART CODE	SPECIFICATIONS	P.C. BOARD 110	P.C. BOARD 220	Q'TY 110	Q'TY 220	IDENTIFICATION NO. FUNCTION
MODEL NUMBER SEAL						
58020300	DDM-110			1	0	
58020400	DDM-220			0	1	
SHIELDING SHEET						
58020700	A KOC-F30043			1	1	
58020701	B KOC-F30044			1	1	
CONNECTION CORD						
60201301	A 2.5			1	1	
VR KNOB						
62013300	A KOC-E40166			1	0	
62013600	A KOC-E40166			0	1	
62013301	B KOC-E40167			1	0	
62013601	B KOC-E40167			0	1	
62013400	SMALL KOC-E40143			3	0	
62013401				0	3	
PUSH SW KNOB						
62013500	KOC-E40169			15	0	
62013501				0	15	
DISPLAY COVER						
63000400	E40170			1	1	
UPPER CASE						
64618400	KOC-E10015			1	0	
64618500				0	1	
LOWER CASE						
64618600	KOC-E10016			1	1	
BATTERY CASE						
64618700	KOC-E30063			1	1	
BATTERY COVER						
64618800	KOC-E40168			1	1	

PART CODE	SPECIFICATIONS	P.C. BOARD 110	P.C. BOARD 220	Q'TY 110	Q'TY 220	IDENTIFICATION NO. FUNCTION
BATTERY TERMINAL						
64905300	(+) KOC-C40503			2	2	
64905400	(–) KOC-C40504			2	2	
SCREW						
74530308	PLAX B ZMC 3 X 8			20	21	
74560310	PLAX B BZMC 3 X 10			5	5	
INNER CARTON BOX						
80020020	DDM-110			1	0	
80020030	DDM-220			0	1	
80220020	PACKING R/L SET			1	1	

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